REMARKS

Claims 1-15 are presently pending in the application.

The Examiner has suggested correction of the word "which" in claim 1, line 2. While it is not seen what is wrong with this term, Applicants have adopted the Examiner's suggestion to change this transitional word to "wherein." Accordingly, it is believed that this correction has been complied with.

Applicants are pleased to note the Examiner's indication that claims 6 and 14 would be allowable if rewritten in independent form (paragraph 6 at page 4 of the Office Action). However, in view of the below Remarks, it is submitted that the claims from which claims 6 and 14 depend are also allowable. Therefore, claims 6 and 14 have not been rewritten in independent form at this time.

The Examiner has rejected claims 1-4 and 8-11 under 35 U.S.C. § 102(b) as anticipated by Japanese Laid-Open Application No. 07-292943 of Motoharu, or alternatively under 35 U.S.C. § 103(a) as obvious over previously cited U.S. Patent 4,952,775 of Yokoyama et al. The Examiner contends that Motoharu teaches an electric floor heating system capable of preventing low-temperature burn, comprising an electric floor heating panel 5 (sic) and a floor material placed there, where the floor material is formed by integrally laminating an upper material 6, a heat diffusion aluminum material 5, and a lower plywood material 4, with the total floor thickness being up to 15mm. Alternatively, the Examiner argues that it would have been obvious to one skilled in the art to modify Motoharu's system by Yokoyama's teaching of an electric floor heating system comprising an electric floor heating panel 20 and a floor material 30-33 placed thereon, where the floor material has a thickness of 10.3mm and is formed by integrally laminating an upper material 30 having a thickness of about 3mm, and a heating diffusing material 22 having a thickness of 1.5mm. These rejections are respectfully but strenuously traversed for the reasons set forth in detail below.

First, for the Examiner's convenience there is submitted herewith an English translation of Motoharu's Japanese Laid-Open Application No. 07-292943, so that the Examiner can understand Applicants' argument below about the inapplicability of Motoharu to the presently claimed invention. Second, although the Examiner phrases the above alternative rejection as

being "obvious over Yokohama," it is believed, based upon the Examiner's comments in the sentence bridging pages 2 and 3 of the Office Action, that this alternative rejection was meant to be "obvious over Motoharu in view of Yokoyama." That is, the alternative rejection was not intended to be a rejection of Yokoyama alone, but rather a combination rejection based upon the modification of Motoharu by Yokoyama, and this is how the rejection will be discussed below.

As a preliminary matter, the lower sheet 5 in the figure of Motoharu is not an electric floor heating panel, as stated by the Examiner. Instead, the two sheets 5 are aluminum sheets on the front and back of the plywood 4. Therefore, the plywood 4 does not contact the heating panel. Instead, the lower, backing sheet 5 of aluminum presumably contacts the heating panel (not shown in the figure of Motoharu).

As an additional preliminary matter, it is submitted that claims 4 and 8 should not be a part of this rejection in paragraph 3 of the Office Action, but rather part of the rejection of paragraph 5 of the Office Action. Thus, both claims 4 and 8 are directed to a panel for an electric floor heating system formed by connecting foldably a predetermined number of electric heating panels to each other. Neither Motoharu nor Yokoyama discloses, and the Examiner so acknowledges in paragraph 5, a foldable floor heating panel. Instead, the Examiner relies upon U.S. Patent 6,766,222 of Seki for disclosing such foldable floor heating panels. Therefore, this rejection is clearly improper with respect to claims 4 and 8.

Turning to the merits of the rejections, as was pointed out in the response to the first Office Action, a salient feature of the present invention lies in adopting a specific relational formula (I) namely $t \geqq a \times d^2 + b$, to so adjust the temperature of the floor surface which may contact the human body, so that the temperature is kept at or below 42°C, which is the maximum temperature which does not cause low-temperature burn from the heater panel below the floor material. This formula makes it possible to easily construct an electric floor heating system comprising a floor material and a heater panel, in such a manner as to provide a comfortable heated environment.

In other words, in order to establish a comfortable heating environment by using a heater panel required for heating a predetermined area, a designer need only determine each of the thicknesses d (of the upper floor material) and t (of the heat diffusing material) to fulfill the

above formula (I) for any power of heater panel listed in relationships (1) to (12) of each of claims 1, 4, 9 and 12. While the formula (I) is only set forth in claim 1 in the above form, the same relationship is provided in the manner of listing the items (1) to (12) of each of claims 4, 9 and 12. As a result of using this formula (I) or the corresponding relationships of the thicknesses t and d, the temperature of the floor surface coming into contact with a human body is maintained at not higher than 42°C. Therefore, even if the human body were in contact with the heater floor surface for a long period of time, low-temperature burn would be prevented.

Nowhere does Motoharu teach or even suggest the relationship represented by formula (I) or the equivalent relationships represented by items (1) to (12) of each of the other claims. Moreover, Motoharu does not teach or recognize the relationship between maximum power (p2) and minimum power (p1) of the maximum power for each of the heating panels (1) to (12) listed in the claims. Therefore, there is nothing in Motoharu that teaches one skilled in the art how to easily determine the thicknesses of the floor materials in order not to cause low-temperature burn. That is, there is no technical concept in Motoharu of adjusting the thickness of the floor material in connection with the heater panel to prevent low-temperature burn.

It is noted that in none of the rejections does the Examiner even address the issue of the formula (I) or the relationship of floor material thicknesses to maximum power of the floor heating panel. These relationships are totally ignored in the rejections. Therefore, for this reason alone, the rejections are improper and should be withdrawn.

Moreover, Motoharu is directed to a totally different system and a totally different problem than the present invention. While Motoharu mentions in the prior art section (paragraph [0002] and [0003]) the use of floor heating systems using an electric heater or a hot water-circulating tube installed under the floor, Motoharu's disclosure is directed to a hot water-circulating system (see paragraph [0020]) and the problem of the expansion and contraction of flooring and the warping thereof due to changes in temperature and moisture entering unevenly through the surfaces of the flooring (see paragraphs [0004] and [0005] of Motoharu).

Motoharu's solution to this problem is setting the total thickness of the plywood to 13mm or less, covering both sides of the plywood base with aluminum sheets, and integrally fixing a natural wood board to the aluminum covered plywood base (paragraph [0006] and [0013] of

Motoharu). This solution not only prevents water or moisture from penetrating into the plywood, thus avoiding warping and sagging, but also assists heat conduction and reduces the risk of low temperature burn. However, this low temperature burn is not from contact with human skin (as in the present invention), but rather contact of the flooring material with clothes or a futon (see paragraph [0021] of Motoharu).

It is noted that the steady state surface temperatures of the two samples of flooring material in the comparative experiment of Motoharu (paragraph [0020]) are 27°C for conventional flooring and 29°C for inventive flooring material, using a hot water-circulating heater panel having a panel surface temperature of 50°C. These temperatures are lower than that of the human body and thus are not a comfortable heating temperature as a floor heating. Hence, one having ordinary skill in the art would have no way of deducing from these experiments the formula or relationships of the presently claimed invention for determining thicknesses of various floor panel layers based upon maximum heating powers of the floor heating panel.

With respect to the alternative rejection based upon the combination of Motoharu with Yokoyama, the Yokoyama reference has already been discussed in the response to the previous Office Action. Yokoyama's system is also clearly different from that of the claimed invention, particularly in that Yokoyama's system is formed by laminating integrally an electric floor heating material 20 and a floor material 30-33, as shown in Figs. 2-4. Yokoyama does not use a lower material as part of the floor material, and the thickness of the heat diffusing material 22 is 1.5mm (outside of the presently claimed range).

In any event, Yokoyama does not make up for the deficiencies of Motoharu, since it is completely silent as to the formula (I) and the relationships between the floor material thicknesses and the maximum powers for the heating panels (1) to (12) set forth in the claims. Yokoyama merely teaches a conventional electric floor heating system, and does not deal with or solve the problem to which the presently claimed invention is directed. Accordingly, reconsideration and withdrawal of this rejection are also respectfully requested.

The Examiner has also rejected claims 5, 7-8, 12-13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Motoharu in view of Yokoyama, and further in view of U.S. Patent 6,776,222 of Seki et al. The Examiner acknowledges that Motoharu in view of Yokoyama does

not disclose a foldable heating panel and boards connected by belts. However, the Examiner contends that Seki teaches a foldable floor heating panel 10 composed of at least 3 heating boards 11. The Examiner concludes that it would have been obvious to modify the invention of Motoharu in view of Yokoyama to include a foldable floor heating panel as taught by Seki to ease floor heating system installation. The Examiner further concludes that providing belts through the holes is a matter of design choice because Applicant has not disclosed that the belts provide an advantage or solve a stated problem. This rejection is also respectfully but strenuously traversed for the following reasons.

Seki has already been fully discussed in the response to the previous Office Action. A foldable floor heating panel as disclosed in Seki was already known (see paragraph [0037 of the present published application), and such a foldable panel is not novel either in the case of a heat carrier type disclosed by Seki or an electric heater type as disclosed in the present application.

In any event, as described above, a salient feature of the present invention is to provide an electric floor heating system without causing low temperature burn, by adopting the relational formula (I) which describes the discovered relationships between thicknesses of floor materials and the maximum powers of a floor heater panel, including a foldable floor heating panel. Seki is also quite silent as to this relational formula (I) and the relationships described in the claims. Therefore, even if Seki were properly combinable to modify Motoharu and Yokoyama, the resulting modification and combination would still not teach or suggest the presently claimed invention. Accordingly, reconsideration and withdrawal of this rejection are also respectfully requested.

In view of the above Remarks, it is submitted that the claims patentably distinguish over the prior art of record. Accordingly, reconsideration of the objections and rejections and an early Notice of Allowance are respectfully requested.

Respectfully submitted,

Kazuo Fukai et al.

September 26, 2005 By: _____
(Date)

WILLIAM W. SCHWARZE
Registration No. 25,918
AKIN GUMP STRAUSS HAUER & FELD LLP
One Commerce Square
2005 Market Street, Suite 2200
Philadelphia, PA 19103-7013
Telephone: 215-965-1200
Direct Dial: 215-965-1270
Facsimile: 215-965-1210
E-Mail: wschwarze@akingump.com

WWS:rc
Enclosure – Petition for Extension of Time (one month)
English translation of JP 07-292943 (Motoharu)